Claims

1. A device, comprising:

a disk holder operable to hold and spin an optical disk;

an optical head having an optical interfacing surface which is operable to couple radiation energy to and from the optical disk held by the disk holder for reading data from or writing data to the optical disk;

an actuator engaged to said optical head and operable to move and position said optical head over the disk; and

a load actuator operable to apply a force to cause said optical head to contact the optical disk at a contact location of said optical interfacing surface when reading or writing data.

2. The device as in claim 1, wherein said optical interfacing surface is a curved surface with a protruded apex at or near which said load actuator causes said optical head to contact the optical disk during reading or writing data.

3. The device as in claim 2, wherein said curved surface is spherical.

4. The device as in claim 2, wherein said optical head is configured to have at least a portion of optical energy totally reflected at said optical interfacing surface.

5. The device as in claim 4, wherein said optical head includes a coupling lens having a first spherical optical surface with a first radius of curvature and a second, opposing spherical optical surface with a second radius curvature greater than said first radius of curvature, wherein said optical interfacing surface is a portion of said second spherical optical surface.

6. The device as in claim 5, wherein said optical head includes an objective lens to couple optical energy to or from said coupling lens.

7. The device as in claim 6, further comprising a lens actuator engaged to at least one of said objective and said coupling lenses and operable to change a spacing therebetween in response to a control signal.

8. The device as in 1, wherein said optical head includes a carrier surface substantially in said optical interfacing surface, wherein said carrier surface includes a plurality grooves to reduce air resistance of said optical head when said optical interfacing surface is in contact with the spinning optical disk.

9. The device as in claim 1, further comprising two parallel springs that engage said optical head to said actuator and confine motion of said optical head in a direction substantially perpendicular to the optical disk.

10. The device as in claim 9, further comprising a flexure having one end engaged to said two parallel springs and another end engaged to said optical head, said flexure configured to have two support pads substantially in a common plane with said contact location of said optical interfacing surface, wherein said load actuator is operable to press said two support pads and said contact location of said optical interfacing surface on the optical disk when said force is applied during reading or writing data.

11. A device, comprising:

a disk holder operable to hold and spin an optical disk;

an optical head having an objective lens and a coupling lens operable to couple radiation energy to and from the optical disk for reading data from or writing data to the optical disk, said coupling lens having an optical interfacing surface through which the radiation energy is coupled;

an actuator operable to cause said optical head to move and position over the disk;

two parallel springs each having one end engaged to said actuator and another end to hold said optical head, said two parallel springs displaced from each other along a direction substantially perpendicular to the optical disk and configured to confine movement of said optical head relative to said actuator along said direction; and

a load actuator operable to apply a force to cause said optical head to contact the optical disk at a contact location of said optical interfacing surface when reading or writing data.

12. The device as in claim 11, wherein said optical interfacing surface of said coupling lens is a curved

surface with a protruded apex at or near which said optical interfacing surface is in contact with the optical disk under said force.

13. The device as in claim 11, wherein said optical head includes a carrier that holds said objective and said coupling lenses, said carrier having a carrier surface substantially in said curved surface.

14. The device as in claim 13, wherein said carrier surface includes a plurality grooves to reduce air resistance of said optical head when said optical interfacing surface is in contact with the spinning optical disk.

15. The device as in claim 11, further comprising a flexure engaged between said two parallel springs and said optical head to allow said optical head move along said direction relative to said two parallel springs, said flexure having two support pads substantially in a common plane with said contact location of said optical interfacing surface, wherein said load actuator is operable to press said two support pads and said contact location of

said optical interfacing surface on the optical disk when said force is applied when reading or writing data.

16. The device as in claim 11, wherein said load actuator includes has a first load actuator part engaged to said actuator and a second actuator part engaged to said optical head, said first and said second load actuator parts operable to move relative to each other along said direction in response to a load control signal.

17. The device as in claim 16, wherein one load actuator part includes a permanent magnet and the other load actuator part includes a magnetic coil.

18. The device as in claim 17, wherein said other load actuator part further includes a second magnet that attracts to said permanent magnet, and wherein said magnetic coil is designed to repel from said permanent magnet when receiving a driving current to load said optical head on the optical disk.

19. The device as in claim 11, further comprising a lens actuator engaged to at least one of said objective and

said coupling lenses and operable to change a spacing therebetween in response to a control signal.

20. The device as in claim 19, wherein said lens actuator includes a piezo-electric element.

21. The device as in claim 19, wherein said lens actuator includes an electrostatic element.

22. The device as in claim 19,wherein said lens actuator includes an electromagnetic element.

23. The device as in claim 19, wherein said coupling lens is engaged to a diaphragm spring to move relative to said objective lens when said diaphragm is deformed.

24. A method, comprising:

causing a curved optical surface of an optical head to be used to couple optical energy between the optical head and an optical disk in reading or writing data;

causing a selected protruded location on the curved optical surface to be in direct contact with the optical disk in reading or writing data; and

causing the optical energy to be coupled through the selected protruded location.

25. The method as in claim 24, further comprising causing two support pads substantially coplanar with the selected protruded location to be provided, and pressing the two support pads and the selected protruded location in contact with the optical disk when data is read or written.